

ABSTRACT

A quantum-sized material and a method for producing such a material according to a predetermined nano-porous polymer template. The method includes the steps of: (a) preparing a nano-porous polymer template, wherein the preparation step includes the sub-steps of (i) dissolving a polymer in a volatile solvent to form an evaporative solution, (ii) depositing a thin film of this solution onto a substrate, and (iii) directing a moisture-containing gas to flow over the spread-up solution film while allowing the solvent in the solution to evaporate for forming a template, which is constituted of an ordered array of nanometer-scaled air bubbles with polymeric walls dispersed in a polymer film; (b) filling the air bubbles with a precursor fluid; and (c) converting the precursor fluid in such bubbles to obtain a quantum-sized material in the form of an array of dots supported in the template. At least one of the dot dimensions is on the 100 nm scale or smaller, preferably smaller than 20 nm.